Electronic Version
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# Claims

[c1] 1. A method for simulating transient conditions in a circuit using a piecewise constant model, the method comprising the steps of:

evaluating an error criteria to determine a maximum allowable change in one of a current and a voltage; and

simulating the transient conditions by implementing an adaptive step in the piecewise constant model according to the maximum allowable change.

[c2] 2. The method of claim 1, wherein the evaluating step includes replacing a plurality of predefined steps of the piecewise constant model.

[c3] 3. The method of claim 1, wherein the error criteria is based on an approximate relative timing error.

[c4] 4. The method of claim 1, wherein the evaluating step executes dynamically during the simulating step.

[c5] 5. The method of claim 1, wherein the evaluating step executes prior to the simulating step.

[c6] 6. The method of claim 1, further comprising the step of

rejecting the adaptive step in the case that a derivative voltage across a circuit element of interest reverses.

[c7] 7. The method of claim 1, wherein a plurality of adaptive steps are implemented, and further comprising the step of limiting the number of adaptive steps.

[c8] 8. The method of claim 1, wherein the evaluating step includes rendering the adaptive step at an average value of the maximum allowable change.

[c9] 9. A method for simulating transient conditions in a circuit using a piecewise constant model including a plurality of steps, the method comprising the steps of:

replacing a plurality of first steps in the piecewise constant model with a lesser number of second steps to address an error criteria; and

simulating the transient conditions using the piecewise constant model including the lesser number of second steps.

[c10] 10. The method of claim 9, wherein the replacing step includes determining a maximum allowable change in one of a current and a voltage, and implementing the second steps in the piecewise constant model according to the maximum allowable change.

[c11] 11. The method of claim 9, wherein the error criteria is

based on an approximate relative timing error.

[c12] 12. The method of claim 9, further comprising the step of rejecting the second step in the case that a derivative voltage across a circuit element of interest reverses.

[c13] 13. The method of claim 9, wherein the replacing step executes dynamically during the simulating step.

[c14] 14. The method of claim 9, wherein the replacing step executes prior to the simulating step.

[c15] 15. The method of claim 9, further comprising the step of limiting the number of second steps.

[c16] 16. The method of claim 9, wherein the replacing step includes rendering the step at an average value of the maximum allowable change.

[c17] 17. A computer program product comprising a computer useable medium having computer readable program code embodied therein for simulating transients conditions in a circuit using a piecewise constant model, the program product comprising:

program code configured to evaluate an error criteria to determine a maximum allowable change in one of a current and a voltage; and

program code configured to simulate the transient

conditions by implementing an adaptive step in the piecewise constant model according to the maximum allowable change.

[c18] 18. The program product of claim 17, wherein the simulating program code replaces a plurality of predefined steps of the piecewise constant model.

[c19] 19. The program product of claim 17, wherein the error criteria is based on an approximate relative timing error.

[c20] 20. The program product of claim 17, wherein the evaluating program code executes dynamically during execution of the simulating program code.

[c21] 21. The program product of claim 17, wherein the evaluating program code executes prior to the simulating program code.

[c22] 22. The program product of claim 17, further comprising program code configured to reject the adaptive step in the case that a derivative voltage across a circuit element of interest reverses.

[c23] 23. The program product of claim 17, wherein a plurality of adaptive steps are implemented, and further comprising program code configured to limit the number of adaptive steps.

[c24] 24. The program product of claim 17, wherein the evaluating program code renders the adaptive step at an average value of the maximum allowable change.

[c25] 25. A system for simulating transient conditions in a circuit using a piecewise constant model, the system comprising:

means for evaluating an error criteria to determine a maximum allowable change in one of a current and a voltage; and

means for simulating the transient conditions by implementing an adaptive step in the piecewise constant model according to the maximum allowable change.

[c26] 26. The system of claim 25, wherein the evaluating means executes dynamically during execution of the simulating means.

[c27] 27. The system of claim 25, wherein the evaluating means executes prior to execution of the simulating means.

[c28] 28. The system of claim 25, further comprising means for rejecting the adaptive step in the case that a derivative voltage across a circuit element of interest reverses.

[c29] 29. The system of claim 25, wherein a plurality of adaptive steps are implemented, and further comprising means for limiting the number of adaptive steps.

[c30] 30. The system of claim 25, wherein the evaluating means includes means for rendering the adaptive step at an average value of the maximum allowable change.